LISTING OF THE CLAIMS:

This listing of claims will replace all prior versions and listings of claims in the application:

1. (Currently amended) A heating apparatus for the conductive heating of a melt, comprising:

at least one electrode; and

a first cooling system configured to transport a cooling fluid to cool the at least one electrode, the first cooling system having [[with]] means for controlling a cooling power variably as a function of time and location in a plurality of selectable regions of the at least one electrode.

2. (Currently amended) The heating apparatus as claimed in claim 1, wherein the first cooling system comprises a fluid-delivery device for delivering [[a]] the cooling fluid at low pressure differences of up to 1 000 mbar.

3. (Currently amended) The heating apparatus as claimed in claim 2, wherein the fluid-delivery device can be set ~~and/or controlled~~ with respect to a variable selected from the group consisting of a temperature, a liquid content, a quantitative flow of the cooling fluid, and any combinations thereof.

4. (Previously presented) The heating apparatus as claimed in claim 2, wherein the first cooling system comprises a multiplicity of first fluid-conducting passages.

5. (Currently amended) The heating apparatus as claimed in claim 4, wherein the multiplicity of first fluid-conducting passages include portions that run transversely with respect to one another ~~in different planes~~.

6. (Currently amended) The heating apparatus as claimed in claim 4, wherein the multiplicity of first fluid-conducting passages are connected to a device for setting ~~and/or controlling~~ a through-flow of the cooling fluid.

7. (Currently amended) The heating apparatus as claimed in claim 6, wherein the device for setting ~~and/or controlling~~ the through-flow of the cooling fluid comprises a setting or control valve.

8. (Currently amended) The heating apparatus as claimed in claim 1, wherein the ~~first cooling system~~ cooling fluid comprises air ~~cooling~~ and/or a liquid ~~cooling~~ and/or an aerosol ~~cooling~~.

9. (Currently amended) The heating apparatus as claimed in claim 1, further comprising a second cooling system and means for setting ~~and/or controlling~~ the first and second cooling systems independently of one another.

10. (Previously presented) The heating apparatus as claimed in claim 9, wherein the second cooling system comprises a multiplicity of second fluid-conducting passages.

11. (Previously presented) The heating apparatus as claimed in claim 10, wherein the multiplicity of second fluid-conducting passages comprise sections that run transversely with respect to sections of the multiplicity of first fluid-conducting passages.

12. (Previously presented) The heating apparatus as claimed in claim 10, wherein the multiplicity of second fluid-conducting passages comprises sections that run parallel to sections of the multiplicity of first fluid-conducting passages.

13. (Currently amended) The heating apparatus as claimed in claim 12, wherein the sections of the multiplicity of second fluid-conducting passages and the sections of the multiplicity of first fluid-conducting passages are ~~guided into~~ coaxial to one another.

14. (Previously presented) The heating apparatus as claimed in claim 10, wherein the multiplicity of first and second fluid-conducting passages are arranged in such a way that at least a section of the multiplicity of first fluid-conducting passages is arranged closer to a melt contact surface of the at least one electrode than the multiplicity of second fluid-conducting passages.

15. (Previously presented) The heating apparatus as claimed in claim 1, wherein the at least one electrode comprises a supporting apparatus.

16. (Previously presented) The heating apparatus as claimed in claim 15, wherein the supporting apparatus is arranged on a side of the at least one electrode that is remote from a melt contact surface of the at least one electrode.

17. (Previously presented) The heating apparatus as claimed in claim 15, wherein the supporting apparatus is a multilayer structure.

18. (Previously presented) The heating apparatus as claimed in claim 15, wherein the support apparatus includes a first layer, which is arranged between the at least one electrode and at least one subsequent second layer of the supporting apparatus, the first layer having a higher thermal conductivity than the at least one subsequent second layer.

19. (Previously presented) The heating apparatus as claimed in claim 18, wherein the first layer comprises a fused-cast and/or dense-sintered material.

20. (Previously presented) The heating apparatus as claimed in claim 16, wherein the side of the at least one electrode that is remote from the melt contact surface bears against one side of the supporting apparatus and wherein the one side of the supporting apparatus has at least a section of a fluid-conducting passage extending therealong.

21. (Previously presented) The heating apparatus as claimed in claim 20, wherein the section is open toward the at least one electrode.

22. (Previously presented) The heating apparatus as claimed in claim 1, wherein the at least one electrode comprises at least two electrode segments.

23. (Previously presented) The heating apparatus as claimed in claim 22, wherein the at least two electrode segments are insulated with respect to one another.

24. (Previously presented) The heating apparatus as claimed in claim 1, wherein the at least one electrode includes a melt contact material that comprises a material selected from the group consisting of an electrically conductive ceramic, SnO_2 ceramic, refractory metals, high-melting metals, tungsten, molybdenum, osmium, hafnium, tantalum, platinum metals, platinum, iridium, rhodium, alloys of any of the foregoing, and any combinations thereof.

25. (Previously presented) The heating apparatus as claimed in claim 1, wherein the at least one electrode includes a melt contact material which comprises a fine-grain-stabilized material.

26. (Previously presented) The heating apparatus as claimed in claim 1, wherein the at least one electrode forms a wall region of a skull crucible.

27. (Previously presented) The heating apparatus as claimed in by claim 1, further comprising at least one temperature sensor.

28. (Previously presented) The heating apparatus as claimed in claim 1, wherein the at least the first cooling system comprises at least one flowmeter.

29. (Previously presented) The heating apparatus as claimed in claim 1, further comprising a heating power control, for controlling a heating current as a function of a variable selected from the group consisting of the cooling power, a melting temperature of the melt, an electrode temperature, and any combinations thereof.

30. (Previously presented) The heating apparatus as claimed in claim 1, further comprising a device for heating the at least one electrode.

31. (Previously presented) The heating apparatus as claimed in claim 30, wherein the device for heating the at least one electrode comprises an ohmic heating device which is suitable for heating the melt and/or parts of the at least one electrode itself.

32. (Previously presented) The heating apparatus as claimed in claim 30, wherein the device for heating the at least one electrode comprises a device for heating the cooling fluid.

33. (Previously presented) The heating apparatus as claimed in claim 1, wherein the heating apparatus forms part of a wall of a melting unit.

34. (Previously presented) The heating apparatus as claimed in claim 33, further comprising edges of the heating apparatus that are cooled in the region in which they adjoin the walls of the melting unit.

35. (Currently amended) A melting unit for the conductive heating of a melt, comprising:

an electrode; and

a cooling system configured to transport a cooling fluid to cool the electrode, the first cooling system having a controller that controls a cooling power variably as a function of time and location in a plurality of selectable regions of the ~~at least one~~ electrode.

36. (New) The heating apparatus as claimed in claim 2, wherein the fluid-delivery device can be controlled with respect to a temperature, a liquid content and/or a quantitative flow of the cooling fluid.

37. (New) A heating apparatus for the conductive heating of a melt, comprising:

at least one electrode having a plurality of selectable regions; and

a first cooling system configured to transport a cooling fluid to cool the plurality of selectable regions, the first cooling system having a controller configured to control a cooling power of the first cooling system in at least some of the plurality of selectable regions variably with respect to others of the plurality of selectable regions.